1. (5 + 15 Marks)
   
   (a) If $a$ and $b$ are two rational numbers then prove that $a + b$ is also rational.

   (b) If $a$ is a rational number and $b$ is not a rational number prove that $a + b$ cannot be rational.

   [Recall: A number is called rational if it can be written as $p/q$ where $p$ and $q$ are some integers.]
2. (15 Marks) Convert the following statement into an expression in propositional logic:

On Sundays or on a rainy day Bob stays home and watches TV. Yesterday Bob stayed at his friend’s place and they watched TV. So it means yesterday it did not rain and yesterday was not Sunday.

3. (15 Marks) If $a$ and $b$ are two primes such that $(a^2 - b^2)$ is divisible by 6 then prove that $(a^2 - b^2)$ is also divisible by 12.